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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,230	02/09/2004	Masakazu Ushijima	0353-0202P	3162
2292	7590	11/29/2005	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			ALEMU, EPHREM	
			ART UNIT	PAPER NUMBER
			2821	

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/773,230	USHIJIMA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Ephrem Alemu	2821	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 September 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4-9,11 and 13-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9,11 and 13-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings were received on 9-06-05. These drawings are acceptable.

### ***Claim Objections***

2. Claim 14 is objected to because of the following informalities:

In claims 4 and 5, lines 3 and 2, respectively, "said shunt transformers" lack antecedent basis since a single shunt transformer being claimed in claims 1 or 2.

In claim 11, line 6, replace "one, forms" to --one, to form-- to clearly indicate the claimed diodes forming the detection circuit.

In claims 23, 24, 25, 26, 27 and 28, line 4, respectively, replace "one, forms" to --one, to form-- to clearly indicate the claimed diodes forming the detection circuit. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 2, 4-9, 11 and 13-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, lines 11-12, the recitation "said adjacent conductor, said parasitic capacitances are backlights being added to each other as appropriate via said shunt transformer, the discharge lamps placed in said backlights comprising an electrode portion and a positive column" is

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indefinite since the limitations “said adjacent conductor, said parasitic capacitances are backlights” and “the discharge lamps placed in said backlights” is not clear.

In claim 8, lines 2-5, “said shunt coils are connected to form a multi-tier structure is indefinite because it is not clear how to connect the two shunt coils as claimed in claim 1 to form a multi-tier structure.

Claim 13, 29, 30, 32 and 34, respectively, are rejected as being indefinite because claims 13, 29, 30, 32 and 34, respectively, directly or indirectly depending on claim 1 calls for “said two coils of each shunt transformer”, however there is only a single shunt transformer claimed in claim 1. Appropriate correction or clarification is required.

Re claim 14, lines 1-2, calls for “a shunt circuit being formed as a module”. Is the shunt circuit different than the “shunt transformer” claimed in claim 1. If so, how is it related with the shunt transformer claimed in claim 1 and the discharge lamps? Appropriate correction or clarification is required.

Claim 15, calls for “a shunt circuit being formed by connecting said shunt transformers” however there is only a single shunt transformer claimed in claim 1. Appropriate correction or clarification is required.

Claims 18 and 19 are rejected as being indefinite because claims 18 or 19 depending indirectly on claim 1 calls for “wherein when said shunt coils are connected to form a multi-tier structure, a reactance value of an upper shunt coil is sequentially reduced in comparison with that of a lower shunt coil, whereby a number of turns of shunt coils is progressively reduced”, however there is only a single shunt transformer claimed in claim 1. Appropriate correction or clarification is required.

Claim 21 is rejected as being indefinite because claim 21 depending on claim 6 calls for “wherein when said shunt coils are connected to form a multi-tier structure, a reactance value of an upper shunt coil is sequentially reduced in comparison with that of a lower shunt coil, whereby a number of turns of shunt coils is progressively reduced”, however it is not clear how the “three or more coils of said shunt transformer” claimed in claim 6 being connected “to form a multi-tier structure as claimed in claim 21. Appropriate correction or clarification is required.

Claims 2, 4-7, 9, 11, 16, 17, 20, 22-28, 31 and 33 are rejected under 35 U.S.C. 112, second paragraph, as being directly or indirectly dependent over a rejected base claim 1

5. Claims 4-8, 16 and 24-28 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: (i) the structural connections between “the plurality of shunt transformers” as claimed in claims 4, 5 and 7, and “shunt transformer” and “plurality of discharge lamps” claimed in claim 1;

(ii) the structural connections between the “three or more coils” as claimed in claim 6 with respect to “the plurality of lamps” claimed in claim 1; and

(iii) the structural connections between “said shunt coils forming a multi tier structure” as claimed in claim 8 and “the discharge lamps” claimed in claim 1;

(iv) the structural relationship between “a shunt circuit” claimed in claim 16 and “the shunt transformer” and “plurality of discharge lamps” claimed in claim 1.

In claims 24, 25, 26, 27 and 28, respectively, the claimed limitations of each claims depending on respective claims 4, 5, 6, 7 and 8, is indefinite because the structural relationship

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between the windings of said shunt transformer and the plurality of discharge lamps have not been provided.

**The office requests all the claims should be carefully revised in order to comply with 35 U.S.C. 112, second paragraph.**

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 2, 6 and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Lin et al. (US 6,717,372).

In light of the rejection 35 U.S.C. § 112 second Paragraph that set forth herein above, the following 35 U.S.C. 102 rejection is based on prior art which reads on the interpretation the claim language of the instant application as best as understood by the Examiner.

Re claim 1, Lin discloses an inverter circuit for discharge lamps (i.e., multi-lamp driving system) for multi-lamp lighting (Figs. 3-6).

wherein two coils (W1, W2) connected to a secondary winding of a step-up transformer (T1) of the inverter circuit (i.e., driving circuit 10) are arranged, and magnetically coupled to each other to form a shunt transformer (i.e., current balance circuit 50) for shunting current such that magnetic fluxes generated thereby are opposed to each other to cancel out, and discharge lamps (Lp1, Lp2) are connected to the coils (W1, W2), respectively, with currents flowing

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therethrough being balanced with each other, wherein a large number of discharge lamps are arranged in a surface light source (i.e., for LCD backlight systems) (Figs. 3-6; Col. 1, lines 12-18; Col. 2, line 45- Col. 3, line 44),

an electric conductor being arranged adjacent to the discharge lamps (Figs. 3-6), wherein parasitic capacitances (i.e., which is inherent in high voltage carrying conductor) are generated between the discharge lamps and the adjacent conductor, the parasitic capacitances (i.e., which is inherent in high voltage carrying conductor) being added to each other as appropriate via the shunt transformer (50) (Figs. 3-6; Col. 2, line 45- Col. 3, line 44),

wherein an impedance characteristic of an electrode portion of each of said discharge lamps and a positive column (i.e., which is also inherent feature of the CCFL discharge lamps) has a negative resistance characteristic (i.e., which is inherent characteristic for the CCFL discharge lamps), and wherein lighting of each of the discharge lamps is caused by the fact that a reactance of an inductance related to balancing operation of the shunt transformer (W1, W2), the reactance being in an operating frequency of the inverter circuit, exceeds a negative resistance of each of the discharge lamps (Figs. 3-6; Col. 2, line 45- Col. 3, line 44).

Re claim 2, as best understood, given Lin's inverter circuit for discharge lamps (i.e., multi-lamp driving system) for multi-lamp lighting, as discussed above in claim 1, when one of the discharge lamps (Lp1, Lp2) connected to the shunt transformer (W1, W2) is not lighted, a core of the shunt transformer (W1, W2) being saturated by a current flowing through a lighted one of the discharge lamps, whereby a voltage having a high peak value being generated at a terminal of the unlighted discharge lamp of the shunt transformer (i.e., balancing circuit 50), thereby applying a high voltage to the unlighted discharge lamp would have been inevitable.

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Re claims 6 and 17, Lin further shows the shunt transformer (50') configured to have three or more coils (W1, W2, W3, ... Wn) arranged such that magnetic fluxes generated by the respective coils (W1, W2, W3, ... Wn) are opposed to each other to cancel out, whereby respective lamp currents (I1, I2, I3, ... In) of discharge lamps (Lp1, Lp2, Lp3, ... Lpn) connected to the coils are simultaneously balanced with each other (Fig. 6; Col. 3, lines 29-44; wherein).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US 6,717,372).

Re claim 14, Lin does not show the surface light source system as claimed in claim 14. However, Lin's inverter circuit for discharge lamps (i.e., multi-lamp driving system) for multi-lamp lighting is used for LCD backlight systems.

Therefore, given Lin's inverter circuit for discharge lamps (i.e., multi-lamp driving system) for multi-lamp lighting as discussed above in claim 1, arranging the shunt transformer in a surface light source system as claimed in claim 14, would have been within the skill of an artisan in order to provide sufficient backlighting for the LCD panel.



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10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US 6,717,372) in view of Takeda et al. (US 2003/0137222).

Re claim 9, Lin does not show the step-up transformer being replaced by a piezoelectric transformer.

Takeda discloses and teaches the use of a compact and high-power piezoelectric transformer to replace conventional step-up transformer for an inverter of a backlight source of a liquid crystal display panel for the purpose of realizing a step-up circuit higher in circuit efficiency than using the conventional step-up transformer (Fig. 1; page 26, paragraph 272).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to replace Lin's step-up transformer with piezoelectric transformer as taught by Takeda for the purpose of realizing a step-up circuit higher in circuit efficiency than using the conventional step-up transformer as taught by Takeda.

11. Claims 13 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (US 6,717,372) in view of Yer et al. (US 2002/0140538 submitted by applicant).

For the purpose of examination, for claims 13 and 29, respectively, "said to coils of each of shunt transformer" has been interpreted as --said two coils of the shunt transformer--

Re claims 13 and 29, Lin does not mention the two coils of the shunt transformer having obliquely-wound windings.

Yer teaches a method of winding a coil of transformer in an obliquely wound windings for the purpose of reducing power consumption as well as improving efficiency over the conventional transformer (paragraphs [0012], [0053], [0060]).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the shunt transformer of Lin by shunt transformer having an obliquely wound windings as taught by Yer for the purpose of reducing power consumption as well as improving efficiency over the conventional transformer as taught by Yer.

***Response to Arguments***

12. Applicant's arguments filed 9/06/05 have been fully considered but they are not persuasive.

In response to applicants' argument that Lin fail to disclose "two coils connected to a secondary winding of a step-up transformer of the inverter circuit are arranged, and magnetically coupled to each other to form a shunt transformer for shunting current such that magnetic fluxes generated thereby are opposed to each other to cancel out" is respectfully disagreed.

Lin discloses two coils (W1, W2) connected to a secondary winding of a step-up transformer (T1) of the inverter circuit (i.e., driving circuit 10) are arranged, and magnetically coupled to each other to form a shunt transformer (i.e., current balance circuit 50) for shunting current such that magnetic fluxes generated thereby are opposed to each other to cancel out (Figs. 3-6; Col. 1, lines 12-18; Col. 2, line 45- Col. 3, line 44). Thus, "magnetic fluxes generated thereby are opposed to each other to cancel out" is an inherent feature of Lin's shunt transformer (i.e., current balance circuit 50) to thereby balancing of the current values flowing through the lamps.

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***Remarks***

13. Regarding claims 4, 5, 7, 8, 11, 15, 16, 18-28 and 30-34, the merits of indication of allowable subject matter or applied prior art will not be provided in this office action based on the 112 second paragraph as indicated above in paragraphs 3 and 4

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

***Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ephrem Alemu whose telephone number is (571) 272-1818. The examiner can normally be reached on M-F Flex hours.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don K. Wong can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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PRIMARY EXAMINER